REMARKS

Claims 1-4 are pending in this application. Claims 1 and 3 have been amended. New dependent claim 4 has been added. No new matter has been introduced. New claim 4 incorporates the features of the embodiment of page 2, second paragraph, of the application.

Claims 1-3 are rejected under 35 U.S.C. § 103(a) as being unpatentable over GB Patent No. 1499536 to Mucenieks ("Mucenieks") in view of U.S. Patent No. 4,678,481 to Diep ("Diep") and U.S. Patent No. 5,108,731 to Schoubye ("Schoubye"), as evidenced by U.S. Patent No. 3,953,578 to Thirion ("Thirion"). This rejection is respectfully traversed.

Amended independent claim 1 recites that the process is conducted "without the use of an absorption tower." The crux of the claimed invention is a process which seeks to avoid the use of an absorption tower (see paragraphs bridging page 1 and 2 of application). A person of ordinary skill in the art would also understand that, from the low temperature (30-150°C) and low concentration of SO_2 in the off-gas covered (as low as 0.001 vol % SO_2 = 10 ppmv) as recited in amended claim 1, the process of the claimed invention is mainly directed to top-up the removal of SO_2 in a gas leaving (e.g.) a wet sulphuric acid condenser such as the wet sulphuric acid condenser of Fig. 2 in the cited Schoubye (which is Applicants' own patent). The upper range of SO_2 concentrations (up to 1 vol % SO_2 = 10000 ppmv) suggests other range of applications.

The subject matter of claims 1-3 would not have been obvious over the cited prior art references, considered alone or in combination. Mucenieks discloses a process for the removal of SO_2- containing gases with concentrations within the range of claim 1 by the use of an absorption tower (p. 3, lines 65-67 and examples). Mucenieks is silent, however, about the treatment of an off-gas at 30-150°C, spraying of an aqueous solution of H_2O_2 without the use of an absorption tower, and subsequently using an aerosol filter.

Diep discloses a process for improving the efficiency of electrostatic precipitators by creating the conditioning agent SO_3/H_2SO_4 by adding H_2O_2 to a flue gas containing SO_2 at temperatures in the range of 300 to 400°F (approximately 150 to 200°C) or even 300 to 500°F

(approximately 150 to 260°C). Thus, Diep is silent about providing an off-gas at 30-150°C, and providing an aerosol filter after the H_2O_2 injection.

Schoubye discloses a process for capturing sulphuric acid droplets in an off-gas leaving a sulphuric acid condenser at 80 to 125°C (col. 9, ll. 17-23) in which the off-gas is passed through an aerosol filter. Schoubye is silent, however, about spraying an aqueous solution of H_2O_2 to said off-gas.

Thirion discloses a process for the purification of flue gases by the successive stages of de-dusting, concentration of sulphuric acid, and absorption of sulphur dioxide in the presence of H_2O_2 (col. 3, ll. 1-6; col. 6, ll. 21-47). Thus, in Thirion, SO_2 is removed from the off-gas in one or two absorption towers operating in the range of 55-80°C with circulating solution containing H_2O_2. Such conventional technology is already acknowledged by Applicants as constituting prior art in the second paragraph of the as-filed application. Thirion is silent about spraying of an aqueous solution of H_2O_2 and subsequently using an aerosol filter.

In conclusion, none of the cited references discloses or suggests all limitations of amended claim 1. Although Thirion is concerned with the same technical problem as the present invention (namely reducing SO_2 in gases before letting them to the atmosphere by means of H_2O_2), Thirion does not disclose or suggest spraying of an aqueous solution of H_2O_2 and subsequently using an aerosol filter, as in the claimed invention. Mucenieks also does not disclose all limitations of amended independent claim 1. Diep is concerned with a completely different technical problem, namely the removal of high resistivity particulate matter in a flue gas to increase the efficiency of electrostatic precipitators, while Schoubye is only concerned with the capturing of sulphuric acid mist droplets from a sulphuric acid condenser.

Applicants also submit that the combination of the cited prior art references would still not disclose or suggest all limitations of the claimed invention. As described above, the claimed invention differs from Thirion in that the gas is sprayed with an aqueous solution of H_2O_2 without the use of an absorption tower and in that an aerosol filter is used downstream. The technical effect

of these differences is that the installation of an absorption tower is no longer required. The objective technical problem of the claimed invention may thus be formulated as the provision of a simpler process for the removal of SO_2 from off-gases. This problem is solved by the present invention as shown in the example.

Starting with Thirion and seeking solutions to this problem, a person skilled in the art would consider the teachings of Mucenieks since Mucenieks relates also to the problem of reducing SO in gases by means of H_2O_2. Nevertheless, the person skilled in the art will only find a teaching on the use an absorption tower. The combination of Thirion and Mucenieks will simply result in a process involving the use of an absorption tower, which the present invention in fact seeks to avoid.

Starting from Thirion and seeking solutions to the above objective technical problem, a person skilled in the art could also consider Schoubye. However, the person skilled in the art will only find details on how to design an acid mist filter. There is no suggestion or disclosure whatsoever on spraying an aqueous solution of H_2O_2 to the gas leaving the sulphuric acid condenser prior to contacting the acid mist filter. The combination of Thirion and Schoubye will simply result in a process with an absorption tower and acid mist filter, which represents the conventional technology, and not the process recited in claims 1-3 of the present application.

Finally, starting from Thirion and seeking solutions to the above objective technical problem, a person skilled in the art would not consider Diep, as Diep is concerned with a completely different technical problem (i.e., removing high resistivity particulate matter from a flue gas to increase the efficiency of a downstream electrostatic precipitator). Even if *arguendo* Diep were to be considered by a person skilled in the art, the person skilled in the art would be led into another direction. Diep teaches that a high amount of SO_2 in the gas is required and that SO_2 is even added to the gas stream (see col. 3, line 5) to make the H_2O_2 addition work, while at the same time a high temperature (above 150°C) in the gas is also required (col. 1, line 44; col. 3, line 15). Further, there is no teaching or suggestion in Diep for providing an aerosol filter after the H_2O_2 injection.

In contrast, in the present invention, it is desirable to operate with off-gases having a low SO_2 content (as low as 0.001 vol. % = 10 ppmv) and it is also desirable to operate at lower temperatures (in a range of about 30-150°C) than those suggested in Diep (which actually are above 150°C cf. col. 1, line 44; col. 3, line 15). Accordingly, even in the unlikely situation that a person skilled in the art would consider Diep to find solutions to the above objective technical problem, the combination of Thirion and Diep would still not disclose or suggest all limitations of claim 1. At most, the person skilled in the art will end up with a solution in which SO_2 has to be added to ensure that the SO_2 content in the gas is high (e.g., 2500 ppmv or above), the temperature of the off-gas is above 150°C, and there is no aerosol filter. This solution is completely different from that recited in amended independent claim 1. Further combining the cited references with Schoubye, which discloses the use of an acid mist filter, would result still in a solution different from that recited in claim 1. Thus, even the combination of three different references would still not result in the claimed subject matter.

Claims 2-4 depend on claim 1 and are also inventive. Even if a person skilled in the art would consider combining Thirion with Diep, the combination would still not disclose or suggest all limitations of claim 3. Although Diep discloses the use of an electrostatic precipitator downstream H_2O_2 injection, a person skilled in the art will still end up with a solution in which SO_2 has to be added to ensure that the SO_2 content in the gas is high, such as 2500 ppmv or above, and in which the temperature of the off-gas is above 150°C. Accordingly, the combination of the two references would still not disclose or suggest all limitations of dependent claim 3.

For at least the reasons above, the Office Action fails to establish a *prima facie* case of obviousness, and withdrawal of the rejection of claims 1-3 is respectfully requested.

Allowance of all pending claims is solicited.

Dated: June 23, 2008

Respectfully submitted,

By _____

Stephen A. Soffen
Registration No.: 31,063
Gabriela I. Coman
Registration No.: 50,515
DICKSTEIN SHAPIRO LLP
1825 Eye Street, NW
Washington, DC 20006-5403
(202) 420-2200
Attorneys for Applicants